

WHAT IS CLAIMED IS:

1 1. For use in a receiver, a video enhancement
2 mechanism for enhancing video information with spatio-
3 temporal consistency comprising:

4 at least one enhancement unit enhancing a
5 characteristic other than position of a selected pixel
6 region of video information utilizing at least one
7 candidate enhancement vector of enhancement algorithms to
8 generate an enhanced pixel region for each candidate
9 enhancement vector, each said enhanced pixel region
10 equivalent to enhancement of said selected pixel region
11 utilizing a respective candidate enhancement vector of
12 enhancement algorithms; and

13 a selection unit computing an error for each said
14 enhanced pixel region utilizing a bias towards spatio-
15 temporal consistency of a respective enhanced pixel region
16 with spatially adjacent pixel regions in a picture
17 containing said selected pixel region and with a
18 counterpart pixel region in one or more pictures successive
19 with said picture containing said selected pixel region,
20 said selection unit selecting an enhanced pixel region
21 having a best enhancement for spatio-temporal consistency.

1 2. The video enhancement mechanism as set forth in
2 Claim 1 wherein said at least one candidate enhancement
3 vector is selected from enhancement vectors determined to
4 produce a best enhancement for spatio-temporal consistency
5 in enhancing pixel regions within a spatial and temporal
6 neighborhood of said selected pixel region.

1 3. The video enhancement mechanism as set forth in
2 Claim 1 wherein said bias towards spatio-temporal
3 consistency further comprises first and second penalties,
4 said first penalty varying based upon coefficients for each
5 candidate enhancement vector and said second penalty
6 varying for each candidate enhancement vector.

1 4. The video enhancement mechanism as set forth in
2 Claim 3 wherein said error is computed on a per-pixel
3 region basis for each pixel region within said video
4 information and for each candidate enhancement vector for a
5 respective pixel region.

1 5. A high definition television receiver comprising:
2 a input connection receiving video information;
3 a display on which enhanced images derived from
4 said video information are displayed; and
5 an video enhancement mechanism for enhancing said
6 video information with spatio-temporal consistency
7 comprising:
8 at least one enhancement unit enhancing a
9 characteristic other than position of a selected pixel
10 region of video information utilizing at least one
11 candidate enhancement vector of enhancement algorithms
12 to generate an enhanced pixel region for each
13 candidate enhancement vector, each said enhanced pixel
14 region equivalent to enhancement of said selected
15 pixel region utilizing a respective candidate
16 enhancement vector of enhancement algorithms; and

17 a selection unit computing an error for each
18 said enhanced pixel region utilizing a bias towards
19 spatio-temporal consistency of a respective enhanced
20 pixel region with spatially adjacent pixel regions in
21 a picture containing said selected pixel region and
22 with a counterpart pixel region in one or more
23 pictures successive with said picture containing said

24 selected pixel region, said selection unit selecting
25 an enhanced pixel region having a best enhancement for
26 spatio-temporal consistency.

1 6. The receiver as set forth in Claim 5 wherein said
2 at least one candidate enhancement vector of enhancement
3 algorithms is selected from enhancement vectors determined
4 to produce a best enhancement for spatio-temporal
5 consistency in enhancing pixel regions within a spatial and
6 temporal neighborhood of said selected pixel region.

1 7. The receiver as set forth in Claim 5 wherein said
2 bias towards spatio-temporal consistency further comprises
3 first and second penalties, said first penalty varying
4 based upon coefficients for each candidate enhancement
5 vector and said second penalty varying for each candidate
6 enhancement vector.

1 8. The receiver as set forth in Claim 6 wherein said
2 error is computed on a per-pixel region basis for each
3 pixel region within said video information and for each
4 candidate enhancement vector for a respective pixel region.

1 9. For use in a receiver, a method of enhancing
2 video information with spatio-temporal consistency
3 comprising:

4 enhancing a characteristic other than position of
5 a selected pixel region of video information utilizing at
6 least one candidate enhancement vector of enhancement
7 algorithms to generate an enhanced pixel region for each
8 candidate enhancement vector, each enhanced pixel region
9 equivalent to enhancement of the selected pixel region
10 utilizing a respective candidate enhancement vector of
11 enhancement algorithms;

12 computing an error for each enhanced pixel region
13 utilizing a bias towards spatio-temporal consistency of a
14 respective enhanced pixel region with spatially adjacent
15 pixel regions in a picture containing the selected pixel
16 region and with a counterpart pixel region in one or more
17 pictures successive with the picture containing the
18 selected pixel region; and

19 selecting an enhanced pixel region having a best
20 enhancement for spatio-temporal consistency.

1 10. The method as set forth in Claim 9 wherein the
2 step of enhancing a characteristic other than position of a
3 selected pixel region of video information utilizing at
4 least one candidate enhancement vector of enhancement
5 algorithms to generate an enhanced pixel region for each
6 candidate enhancement vector further comprises:

7 selecting the at least one candidate enhancement
8 vector of enhancement algorithms from enhancement vectors
9 determined to produce a best enhancement for spatio-
E0 temporal consistency in enhancing pixel regions within a
E1 spatial and temporal neighborhood of the selected pixel
E2 region.

1 11. The method as set forth in Claim 9 wherein the
2 step of computing an error for each enhanced pixel region
3 utilizing a bias towards spatio-temporal consistency of a
4 respective enhanced pixel region with spatially adjacent
5 pixel regions in a picture containing the selected pixel
6 region and with a counterpart pixel region in one or more
7 pictures successive with the picture containing the
8 selected pixel region further comprises:

9 adding first and second penalties to the error as
10 the bias, the first penalty varying based upon coefficients
11 for each candidate enhancement vector and the second
12 penalty varying for each candidate enhancement vector.

1 12. The method as set forth in Claim 11 wherein the
2 step of computing an error for each enhanced pixel region
3 utilizing a bias towards spatio-temporal consistency of a
4 respective enhanced pixel region with spatially adjacent
5 pixel regions in a picture containing the selected pixel
6 region and with a counterpart pixel region in one or more
7 pictures successive with the picture containing the
8 selected pixel region further comprises:

9 computing the error on a per-pixel region basis
10 for each pixel region within the video information and for
11 each candidate enhancement vector for a respective pixel
12 region.

1 13. A computer program product within a computer
2 usable medium for enhancing video information with spatio-
3 temporal consistency comprising:

4 instructions for enhancing a characteristic other
5 than position of a selected pixel region of video
6 information utilizing at least one candidate enhancement
7 vector of enhancement algorithms to generate an enhanced
8 pixel region for each candidate enhancement vector, each
9 enhanced pixel region equivalent to enhancement of the
10 selected pixel region utilizing a respective candidate
11 enhancement vector of enhancement algorithms;

12 instructions for computing an error for each
13 enhanced pixel region utilizing a bias towards spatio-
14 temporal consistency of a respective enhanced pixel region
15 with spatially adjacent pixel regions in a picture
16 containing the selected pixel region and with a counterpart
17 pixel region in one or more pictures successive with the
18 picture containing the selected pixel region; and

19 instructions for selecting an enhanced pixel
20 region having a best enhancement for spatio-temporal
21 consistency.

1 14. The computer program product as set forth in
2 Claim 13 wherein the instructions for enhancing a
3 characteristic other than position of a selected pixel
4 region of video information utilizing at least one
5 candidate enhancement vector of enhancement algorithms to
6 generate an enhanced pixel region for each candidate
7 enhancement vector further comprise:

8 instructions for selecting the at least one
9 candidate enhancement vector of enhancement algorithms from
10 enhancement vectors determined to produce a best
11 enhancement for spatio-temporal consistency in enhancing
12 pixel regions within a spatial and temporal neighborhood of
13 the selected pixel region.

1 15. The computer program product as set forth in
2 Claim 14 wherein the instructions for computing an error
3 for each enhanced pixel region utilizing a bias towards
4 spatio-temporal consistency of a respective enhanced pixel
5 region with spatially adjacent pixel regions in a picture
6 containing the selected pixel region and with a counterpart
7 pixel region in one or more pictures successive with the
8 picture containing the selected pixel region further
9 comprise:

10 instructions for adding first and second
11 penalties to the error as the bias, the first penalty
12 varying based upon coefficients for each candidate
13 enhancement vector and the second penalty varying for each
14 candidate enhancement vector.

1 16. The computer program product as set forth in
2 Claim 15 wherein the instructions for computing an error
3 for each enhanced pixel region utilizing a bias towards
4 spatio-temporal consistency of a respective enhanced pixel
5 region with spatially adjacent pixel regions in a picture
6 containing the selected pixel region and with a counterpart
7 pixel region in one or more pictures successive with the
8 picture containing the selected pixel region further
9 comprise:

10 instructions for computing the error on a per-
11 pixel region basis for each pixel region within the video
12 information and for each candidate enhancement vector for a
13 respective pixel region.

1 17. A video information signal comprising:
2 a data stream containing one or more pictures;
3 and

4 at least one enhanced pixel region within at
5 least one of said pictures, each enhanced pixel region
6 derived from received video information by enhancing a
7 characteristic other than position of a selected pixel
8 region of said received video information utilizing at
9 least one candidate enhancement vector of enhancement
10 algorithms to generate a candidate enhanced pixel region
11 for each candidate enhancement vector, each candidate
12 enhanced pixel region equivalent to enhancement of said
13 selected pixel region utilizing a respective candidate
14 enhancement vector of enhancement algorithms,

15 wherein each enhanced pixel region within a
16 respective picture has a best enhancement for spatio-
17 temporal consistency among said candidate enhanced pixel
18 regions for an error utilizing a bias towards spatio-
19 temporal consistency of said respective enhanced pixel
20 region with spatially adjacent pixel regions in a picture
21 containing said selected pixel region and with a
22 counterpart pixel region in one or more pictures successive
23 with said picture containing said selected pixel region.

1 18. The video information signal as set forth in
2 Claim 17 wherein said at least one candidate enhancement
3 vector is selected from enhancement vectors determined to
4 produce a smallest computed error value in enhancing pixel
5 regions within a spatial and temporal neighborhood of said
6 selected pixel region.

1 19. The video information signal as set forth in
2 Claim 17 wherein said bias towards spatio-temporal
3 consistency comprises first and second penalties, said
4 first penalty varying based upon coefficients for each
5 candidate enhancement vector and said second penalty
6 varying for each candidate enhancement vector.

1 20. The video information signal as set forth in
2 Claim 19 wherein each said enhanced pixel region within any
3 picture is selected utilizing said error computed on a per-
4 pixel region basis for each pixel region within said
5 received video information and for each candidate
6 enhancement vector for a respective pixel region.